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Environmental Protection Agency  
ENERGY STAR Homes  
401 M Street S.W. (6202J)  
Washington, DC 20460

August 19, 2005

Re.: National Specifications for ENERGY STAR Qualified Homes 2006 Specification

Dear Sam & Jon:

On behalf of the Northeast HERS Alliance, we would like to provide our comments regarding the 2006 ENERGY STAR Qualified Homes Specifications, July 27, 2005 draft. We sincerely appreciate the EPA's responsiveness to our previous suggestions and willingness to work so actively with your partners, including the Northeast HERS Alliance. At this time, we feel as though you have been able to modify your original proposal to meet most of our original concerns, yet we still have a few remaining issues.

We have attached a detailed discussion of our comments, concerns and suggestions. Below, we highlight the outstanding issues and suggested remedies.

1. Implementation Schedule: Due to existing utility program commitments to current participants, some flexibility with a grandfathering provision is highly recommended. We will have some upset builders if we have to go back to them and inform them that they will need to change the construction standards that they have already committed to.
2. Duct Leakage Standard in the Performance Path: Although all of us in the Alliance applaud EPA's push to tighter ducts and agree that the standards you have suggested are desirable, we are concerned about the aggressive schedule. In some of our markets, we have average duct leakage rates up to three times the standards you propose. We would like to move our homes to these tighter standards but are afraid that we will lose program participants if we ratchet down the standards too quickly or aggressively. Once builders leave our ENERGY STAR programs, we then lose all opportunities to get them to improve their homes. We have provided three alternative

approaches that we feel can achieve tight ducts but still allow us to keep builders in our programs to enable us to work with them in the process.

3. Equipment Sizing: Given that the ENERGY STAR HVAC program has moved away from equipment sizing and the other problems with implementing a verifiable and enforceable sizing requirement should be considered in considering whether it really is worth including this requirement.
4. Thermal Envelope Requirements in the Prescriptive Path: Referencing the “HERS Reference Home” is an unworkable standard and needs to be thought through and clarified.
5. CFLs: We continue to feel strongly that CFLs should be considered at least as equally a lighting savings measure as fixtures.

Please have a look at our attached comments for additional recommendations and more detail on the above issues.

We look forward to continuing to work with you in support of ENERGY STAR Homes and would be happy to answer any questions or provide clarification on any of our suggestions.

Sincerely,

A handwritten signature in black ink that reads "Richard Faesy". The signature is written in a cursive, flowing style.

Richard Faesy  
President

Enclosure: “Comments from the Northeast HERS Alliance on the EPA ENERGY STAR Proposal”

## Comments from the Northeast HERS Alliance on the EPA ENERGY STAR Proposal

8/19/2005

### Overview

We welcome EPA's second draft of the new ENERGY STAR standard for homes; it is much improved over the original draft, and EPA has addressed many of the stakeholders' concerns in a collaborative manner that will help ensure success of ENERGY STAR brand and regional programs for the long term. Some of the comments below are "fine-tuning" issues regarding technical language, but four come to the front regarding serious implementation barriers: the implementation schedule, the duct leakage standard in the performance path, the equipment sizing requirements in both paths, and the thermal envelope requirement in the prescriptive path. We present the following comments and suggestions and appreciate the opportunity to assist EPA in finalizing the standard in a way that provides for a high degree of participation in the program, resulting in significant energy savings.

### Implementation Schedule

We welcome a requirement for new sign-in's (or commitments) to meet the new standard by July 1, 2006, and are open to moving that date somewhat earlier. However, several programs in the Northeast are legally committed to provide incentives through calendar year 2006 for projects that have already signed, so we request that the cutoff for *completions* with the old HERS standard be moved back to December 31, 2006 or later.

### Performance Path

Envelope (note 2): Our understanding is that EPA does not intend to include a requirement for the thermal envelope equivalency in the performance path, and we agree such a requirement is inappropriate for the performance path.

Duct leakage (Table, note 5)

- Instituting such a stringent duct tightness standard in one step would likely have a devastating effect on participation in ENERGY STAR in much of the Northeast. Although many programs and providers are actively working with builders and HVAC contractors in the Northeast to tighten ducts, progress has been slow. Instituting such a stringent standard risks losing a large percentage of participants; these active ENERGY STAR partners may be able to get to the target over time, but if they walk away now (which many probably would) we will forever lose the opportunity to work with them to get to tighter duct systems, and lose long-term savings that would otherwise be achieved in time. Three suggestions follow that could address this problem reasonably and constructively with the least amount of damage:
  - Allow a phase-in period to allow programs to work more aggressively to address these issues. Consider a graduated program that allows a higher threshold the first year, moving toward the target of 6 CFM25 / 100 s.f. in a 2-3 year process, so that participants will have time to achieve successful results.
  - Allow a less stringent standard for the performance path—8 CFM25 / 100 s.f. is the suggestion (10 was our original suggestion in the comments to EPA on the first draft,

which did not have *any* duct sealing standard in the performance path). Let the performance path do its job, and set an upper limit which is still a step in the right direction; consider moving the limit down for future updates of the standard after participants have a chance to improve their performance.

- Allow for a higher threshold for sheet metal “extended plenum” systems. These systems are predominant in much of the Northeast. Such systems have many more connections, and thus are much more difficult to get to the same level of tightness than single-plenum flex duct systems. When the air handler is in the attic (which is typical, unlike some markets where it’s often in an interior closet), the type of leakage threshold proposed will be nearly taken up just by the air handler. This increases the disparity between metal and flex systems, because the ducts themselves would need to be virtually leak-free to meet the overall limit. The suggestion for a sheet metal standard is 9 CFM 25 / 100 s.f. for systems that are at least 50% constructed of sheet metal. (Leakage at the air handler should be addressed with equipment manufacturers, since many of the leaks cannot be sealed properly without interfering with service or voiding the warranty.)
- Specify “CFM25”. “CFM,” without a test pressure, is not a meaningful specification.
- Remove “total leakage” test requirement. Only leakage to outside has an energy penalty. The need for total leakage testing for most duct systems is inconsistent with the exclusion for ducts that are inside conditioned space with a tight envelope. Comfort problems are driven much more by poor duct design and balancing than they are by leakage to the interior. Also, as measured, a substantial amount of the “total” leakage is often no more than an unimportant, non-airtight connection between the edges of a register grille and a textured ceiling or wall.
- The exception to duct testing for ducts located in conditioned space should include “ducts and air handler” located in conditioned space. The air handler has the largest pressures across any leaks, and should not be exempt from duct testing if it is outside the conditioned space boundary.

#### Energy Star products

- Windows should include “or better” with a footnote stating that in absence of an Energy Star label, an NFRC rating is required to document thermal performance as specified.
- Eliminate the exclusion for HERS credit over 5 light fixtures. Let the HERS score treat every btu or kWh as having equal value. Also, counting the number of fixtures is inconsistent with the 2006 RESNET standard, which requires software to calculate score credit based on the percentage of efficient fixtures, rather than the number.
  - If this exclusion is maintained, it must apply to hard-wired fixtures as well as screw-base CFL’s, based on EPA’s rationale for including this limit in the first place!
- Include screw-base CFL’s, not just fixtures.

#### Equipment sizing (note 7):

- We wish to point out that in the recent development (3 rounds) of the 2007 AC/Heat Pump ENERGY STAR standard, EPA has moved away from the original requirement to use Manual J (Draft 1, January 28, 2005—albeit without specific evaluation or verification criteria); to a reference to the possibility of a separate label indicating verified quality installation (Draft 2, May 27, 2005); and finally to a requirement that partners include a

statement that “Proper sizing and installation of equipment is critical to achieve optimal performance” (Final Draft, August 2, 2005). It seems incongruous that EPA, with input from the entire HVAC industry, not only could not agree on correct sizing criteria and field verification strategy, but has successively backed away from anything more than a general educational statement to be associated with the use of the ENERGY STAR label, and *yet* appears poised to attempt to *require raters to verify and enforce compliance with the strict sizing requirements outlined in the HERS software standard*. This will either be impossible to implement, or (if strictly adhered to) has the potential to erode the successes of ENERGY STAR as raters attempt to hold HVAC contractors to the standard and the builders say “I don’t need this headache.”

The sizing parameters in the RESNET standard are for software, not for HVAC contractors or raters to determine proper sizing. Replace the language with: “Impact of sizing of heating and cooling equipment should be accounted for by rating software according to RESNET standards. More information on these protocols can be found in section 303.5.1.5 [corrected reference to the new Standard] of the HERS Standard.”

Hot water (note 13):

- There should be no requirement for minimum water heating efficiency in the performance path, delete this footnote. It would be appropriate here to simply prohibit the use of a “tankless coil on a boiler.” One possible reason to suggest an indirect tank or a high EF requirement would be to discourage atmospheric equipment. If EPA wishes to keep this requirement in the performance path, use the suggested language under note 4 in the BOP (below).

### **Prescriptive (National BOP):**

Equipment (note 2):

- The sizing parameters in the RESNET standard are for software, not for HVAC contractors or raters to determine proper sizing. (See comments above). If EPA wishes to pursue this track, replace language in the BOP note 2, beginning with the 2<sup>nd</sup> sentence, with: “Refrigerant-based heating and cooling equipment should be sized according to ACCA Manual J and Manual S, or equivalent methodology. Acceptable inputs to the sizing calculations should be in accordance with the operating conditions found in section 303.5.1.5 of the RESNET Standard.” In addition, the RESNET standard is missing *acceptable oversizing limits* for actual equipment installation; to hold someone to this standard strictly speaking would result in virtually impossible compliance, because the standard specifies an extremely narrow range (within 100 btu/hr) of sizing the equipment to the building load. This (and other provisions in the RESNET standard) conflict with Manual S (Equipment Selection) due to their differing purpose; the acceptable limits as defined in Manual S would need to be referenced or explicitly stated. Finally, there is a procedure in Manual S regarding the use of detailed manufacturer’s performance data, rather than ARI ratings, in order to determine correct equipment capacity for the local design conditions; the RESNET standard does not require the use of manufacturer’s performance data, which would add another burden on raters to verify.

Hot water (note 4):

- Replace with: “In homes with oil or gas hydronic equipment, domestic water heating must be provided by an indirect-fired storage tank as a zone off the space heating boiler. Alternately, an oil or gas water heater with an EF of 0.78 or higher may be used.” Also make this change (or brief summary) in the table under “water heater” on front page.

Duct Leakage (note 5): same comments as for the performance path above; suggestion for sheet metal systems is 6 CFM25.

Windows (Note 11): same as comment under Energy Star products for performance path, above—require NFRC rating for non-labeled windows. Also, the threshold for requiring the formula for window U- or SHGC- adjustments should be 18% WFA, not 21% WFA as stated.

Envelope (note 7):

Referring to the “HERS Reference Home” is unworkable, because the envelope definition in the RESENT Standard is expressed in U-factors (for software calculations, rather than raters’ field interpretation). There is some disagreement even among experts regarding the precise correlation between U-factors and cavity insulation R-values. Most raters, and nearly all builders, would be unable to take this information and apply it correctly to determine the required specifications for the building. An R-value table solves this problem by clearly stating prescriptive requirements in terms builders and raters can understand. Table 1 and its footnotes provide the prescriptive requirements that are equivalent to the HERS reference home; note that it requires insulation inspections to verify insulation performance. Table 2 is provided as an alternate for EPA to consider, as an option that would not require the insulation inspection; Table 2 is not necessary in order to adopt Table 1. A suggestion for the wording of note 7: “Insulation shall be installed according to the R-values shown in Table 1.”

Lighting (note 13): EPA should specify that for homes with 10 or fewer appliances and fixtures, 50% of the fixtures and appliances supplied is adequate to meet this requirement.

**Thermal Bypass Checklist:** In the instructions (2<sup>nd</sup> page), note 6: change the reference to “Provider or rater” to “Provider and rater;” raters should not have the sole discretion of determining this equivalence without including the Provider in the loop.

**Table 1—R-value requirements by Climate Zone<sup>(a,b)</sup>**

<u>Climate Zone<sup>(c)</sup></u>	<u>Fenestration and Opaque Door U-Factor</u>	<u>Glazed Fenestration Assembly SHGC</u>	<u>Ceiling R-value<sup>(d,e)</sup></u>	<u>Frame Wall R-value</u>	<u>Floor Over Unconditioned Space R-value</u>	<u>Basement Wall R-value<sup>(f)</sup></u>	<u>Crawl Space R-value</u>	<u>Slab-on-Grade<sup>(g,h)</sup> R-Value &amp; Depth</u>
<u>1</u>	<u>1.20</u>	<u>0.40</u>	<u>30</u>	<u>13</u>	<u>13</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>2</u>	<u>0.75</u>	<u>0.40</u>	<u>30</u>	<u>13</u>	<u>13</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>3</u>	<u>0.65</u>	<u>0.40</u>	<u>30</u>	<u>13</u>	<u>19</u>	<u>0</u>	<u>5/13</u>	<u>0</u>
<u>4 except Marine</u>	<u>0.40</u>	<u>0.55</u>	<u>38</u>	<u>13</u>	<u>19</u>	<u>10/13</u>	<u>10/13</u>	<u>10, 2 ft.</u>
<u>5 and Marine e 4</u>	<u>0.35</u>	<u>0.55</u>	<u>38</u>	<u>19 or 13+5</u>	<u>30</u>	<u>10/13</u>	<u>10/13</u>	<u>10, 2 ft.</u>
<u>6</u>	<u>0.35</u>	<u>0.55</u>	<u>49</u>	<u>19 or 13+5</u>	<u>30</u>	<u>10/13</u>	<u>10/13</u>	<u>10, 4 ft.</u>
<u>7 and 8</u>	<u>0.35</u>	<u>0.55</u>	<u>49</u>	<u>21 or 13+7</u>	<u>30</u>	<u>10/13</u>	<u>10/13</u>	<u>10, 4 ft.</u>

**Notes:**

- (a) All insulation must be verified as “Grade I” by an insulation inspection according to RESNET standards.
- (b) Alternate packages may be calculated by a UA tradeoff with a RESNET-approved tool.
- (c) Climate zones shall be as specified by the 2004 Supplement Edition of the IECC.
- (d) Flat ceiling insulation shall be installed such that the framing is entirely covered with insulation.
- (e) Cathedral ceilings may not comprise more than 20% of the total ceiling area, unless a minimum of R-10 of the required R-value is provided by continuous rigid foam insulation.
- (f) For basements where the conditioned space boundary comprises the basement walls.
- (g) R-5 shall be added to the required R-value for slabs with embedded heating.
- (h) Slab-on-grade insulation “depth” is considered valid in either the horizontal or the vertical direction, but must be continuous to the top of the slab.

**Table 2 – R-value requirements for insulation inspected after building completion <sup>(a)</sup>**

<u>Climate Zone <sup>(b)</sup></u>	<u>Ceiling R-value <sup>(c)</sup></u>	<u>Frame Wall R-value <sup>(d)</sup></u>	<u>Floor Over Unconditioned Space R-value <sup>(e)</sup></u>	<u>Basement Wall R-value <sup>(f)</sup></u>	<u>Crawl Space R-value <sup>(c)</sup></u>	<u>Slab-on-Grade <sup>(g,h)</sup> R-Value &amp; Depth</u>
<u>1</u>	<u>n/a</u>	<u>13 + 5</u>	<u>21</u>	<u>0</u>	<u>n/a</u>	<u>0</u>
<u>2</u>	<u>n/a</u>	<u>13 + 5</u>	<u>21</u>	<u>0</u>	<u>n/a</u>	<u>0</u>
<u>3</u>	<u>n/a</u>	<u>13 + 5</u>	<u>19 + 5</u>	<u>0</u>	<u>n/a</u>	<u>0</u>
<u>4 except Marine</u>	<u>n/a</u>	<u>13 + 5</u>	<u>19 + 5</u>	<u>13 + 5</u>	<u>n/a</u>	<u>10, 2 ft.</u>
<u>5 and Marine 4</u>	<u>n/a</u>	<u>19 + 5</u>	<u>30 + 7</u>	<u>13 + 5</u>	<u>n/a</u>	<u>10, 2 ft.</u>
<u>6</u>	<u>n/a</u>	<u>19 + 5</u>	<u>30 + 7</u>	<u>13 + 5</u>	<u>n/a</u>	<u>10, 4 ft.</u>
<u>7 and 8</u>	<u>n/a</u>	<u>21 + 5</u>	<u>30 + 7</u>	<u>13 + 5</u>	<u>n/a</u>	<u>10, 4 ft.</u>
<b>Notes:</b> (a) <u>Applicable when single inspection is performed and wall insulation is not visible. Window U- and SHGC requirements are required to meet those values in Table 1.</u> (b) <u>Climate zones shall be as specified by the 2004 Supplement Edition of the IECC.</u> (c) <u>Uninspected alternate is not available. Attic and crawlspace insulation must be installed and inspected according to Table 1. These areas are generally accessible for inspection after drywall is installed.</u> (d) <u>"13+5" means R-13 cavity insulation (or 19 or 21) plus R-5 insulated sheathing. If structural sheathing covers 25% or less of the exterior, R-5 sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25% of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.</u> (e) <u>"19+5" means R-19 cavity insulation plus R-5 insulating sheathing. "30+7" means R-30 cavity insulation plus R-7 insulating sheathing.</u> (f) <u>For basements where the conditioned space boundary comprises the basement walls. "13+5" means R-13 cavity insulation plus R-5 continuous rigid insulation.</u> (g) <u>R-5 shall be added to the required R-value for slabs with embedded heating.</u> (h) <u>Slab-on-grade insulation "depth" is considered valid in either the horizontal or the vertical direction, but must be inspected to be continuous to the top of the slab.</u>						